Public Service Commission of Wisconsin

Rebecca Cameron Valcq, Chairperson
Ellen Nowak, Commissioner
Tyler Huebner, Commissioner

4822 Madison Yards Way
P.O. Box 7854
Madison, WI 53707-7854

January 20, 2021

To the Parties:

Re: Quadrennial Planning Process III 5-FE-101

Comments Due:	Address Comments To:
Friday, February 5, 2021 - 4:00 pm.	**Steffany Powell Coker** Public Service Commission P.O. Box 7854 Madison, WI 53707-7854
This docket uses the Electronic Records Filing system (ERF).	

The Commission memorandum concerning the Focus on Energy Evaluation Work Group's recommendation to the Commission on a method for calculating avoided transmission and distribution costs for the purposes of evaluating Focus on Energy is being provided to the parties for comment. Comments must be received by 4:00 pm. on Friday, February 5, 2021. Party comments must be filed using the Commission's ERF system. The ERF system can be accessed through the Public Service Commission's web site at http://psc.wi.gov. Members of the public may file comments using the ERF system or may file by mail at the Public Service Commission, 4822 Madison Yards Way, P.O. Box 7854, Madison, WI 53707-7854.

Please direct questions about this docket or requests for additional accommodations for the disabled to the Commission's docket coordinator, Jolene Sheil at (608) 266-7375 or Jolene.Sheil@wisconsin.gov.

Sincerely,

Kristy Nieto
Division Administrator
Division of Digital Access, Consumer and Environmental Affairs

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Attachment

PUBLIC SERVICE COMMISSION OF WISCONSIN

Memorandum

January 20, 2021

FOR COMMISSION AGENDA

TO: The Commission

FROM: Kristy Nieto, Administrator
Tara Pray, Deputy Administrator
Joe Pater, Director Office of Energy Innovation
Mitch Horrie, Evaluation Manager, Focus on Energy
Division of Digital Access, Consumer and Environmental Affairs

RE: Quadrennial Planning Process III 5-FE-101
Evaluation Work Group Recommendations to the
Commission of a Method for Calculating Avoided
Transmission and Distribution Capacity Costs

Suggested Minute: The Commission directed the Division of Digital Access, Consumer and Environmental Affairs to draft an order in accordance with its discussion.

In its June 1, 2020, order (PSC REF#: 390566) establishing the step-by-step method for calculating avoided electric capacity costs for the purpose of evaluating Focus on Energy (Focus), the Commission also directed "the Focus Evaluation Work Group (EWG) to propose to the Commission a method for calculating avoided transmission and distribution (T&D) costs for the purpose of evaluating Focus."

This memorandum (1) details the method that the EWG is recommending, (2) summarizes the process that was undertaken to arrive at the recommended method, (3) presents the values for avoided T&D costs for the purposes of evaluating Focus, (4) requests approval of the EWG's recommended method for calculating avoided T&D costs for the purposes of evaluating Focus, (5) requests approval of EWG's recommendation to review avoided T&D cost values annually, (6) seeks Commission direction on whether to incorporate avoided T&D costs

into a parallel analysis of benefits as part of the evaluation of Quad III programs, and (7) seeks Commission direction on whether to consider avoided T&D costs as part of the quadrennium (Quad) IV Planning Process for Focus.

Background

Calculating the benefits of Focus requires an understanding of the costs that are avoided when energy consumption and demand are reduced. The approaches for developing and updating electricity and natural gas avoided costs of energy are well established in previous Commission orders.[1] More recently, the Commission approved an updated method for calculating avoided capacity costs. (PSC REF#: 390566.) In this most recent order, the Commission directed the EWG to propose a method for calculating avoided T&D costs for the purpose of evaluating Focus.

The EWG was established during the Quad I Planning Process for Focus to advise the Commission on Focus evaluation issues. The EWG consists of a Commission staff representative that serves as the chairperson of the Work Group, a representative from the Program Administrator, an Evaluation Contractor representative, a utility representative, and an industry expert representative. (PSC REF#: 137129.)

The EWG concludes that including avoided T&D costs in evaluating Focus will allow for a more complete accounting of the benefits of Focus, and will enhance the ability to compare the benefits Focus delivers compared to its costs relative to programs in other states and territories. Additionally, defining avoided T&D values could take on growing importance if the Commission were to increase the emphasis on demand savings in setting future goals for Focus.

[1] See: PSC REF# 158228, PSC REF#: 166932, PSC REF#: 215245, PSC REF#: 232431, and PSC REF#: 343909.

Accounting for avoided T&D costs in cost-effectiveness testing is common in the U.S. An October 2020 American Council for an Energy-Efficient Economy (ACEEE) national survey of state policies and practices for evaluation of energy efficiency programs found that 84 percent of states include avoided T&D costs in cost-effectiveness testing.[2] A 2015 report from the ACEEE lists 38 entities (utilities or other jurisdictions such as states or electric system operators) using avoided T&D values of between $12.14 and $200.01 per kilowatt-year (kW-Year).[3] Even with all of these entities using avoided T&D costs, the US Environmental Protection Agency (EPA) has stated that "The benefit of avoided T&D costs is often overlooked or addressed qualitatively in resource planning because estimating the magnitude of these costs is typically more challenging than estimating the avoided costs of electric generation and plant capacity."[4] In 2014, the Mendota Group, a Madison, WI based investment group, studied and reported on a survey of methodologies used to estimate avoided T&D conducted on behalf of Xcel Energy.[5] This study helps explain the range of avoided T&D values presented in the ACEEE report, as well as building upon the complexity summarized to in the EPA report, stating "while there was some commonality, significant differences in methodological approach are apparent." The Mendota Group report goes on to conclude that "there may not be a best practice method to

[2] York, D., C. Cohn, and M. Kushler. 2020. *National Survey of State Policies and Practices for Energy Efficiency Program Evaluation*. Washington, DC: American Council for an Energy-Efficient Economy. www.aceee.org/research-report/u2009.

[3] Baatz, B. *Everyone Benefits: Practices and Recommendations for Utility System Benefits of Energy Efficiency*; American Council for an Energy-Efficient Economy: Washington, DC, USA, 2015; Available online: https://www.aceee.org/research-report/u1505.

[4] EPA (Environmental Protection Agency). 2018. *Quantifying the Multiple Benefits of Energy Efficiency and Renewable Energy*. Washington, DC, USA, 2018; Available online: https://www.epa.gov/sites/production/files/2018-07/documents/epa_slb_multiple_benefits_508.pdf.

[5] "Benchmarking Transmission and Distribution Costs Avoided by Energy Efficiency Investments." Filed on behalf of Public Service Company of Colorado. October 23 2014. Available online: http://mendotagroup.com/wp-content/uploads/2018/01/PSCo-Benchmarking-Avoided-TD-Costs.pdf.

determine avoided T&D because many different methods may be capable of producing a valid estimate."

Considering the range of avoided T&D cost values and approaches for calculating these values, the EWG defined preferences for approaches to be considered. These include: (1) maximizing reliance on readily available and transparent data, (2) straightforward calculations based on standard engineering and economic principles, (3) ensuring regional specificity, and (4) approaches that can be developed and updated efficiently. Cadmus, the Focus third party evaluator, subsequently conducted a literature review, a review of available data sources, reviews of approaches and values used in other jurisdictions, and developed an initial set of favored approaches. The Cadmus Team then coordinated with the EWG and reviewed other open PSC dockets to identify and interview stakeholders[6] for feedback on the preferred approaches, alternatives, available and recommended data sources, and key consideration for using and applying values for different T&D investments. After compiling this feedback, the updated recommended approach, a summary of the stakeholder input, and the alternatives considered were presented to the EWG by the Cadmus Team.

Alternatives presented to the EWG include using utility-specific approaches requiring data related to system planning and approaches using publicly reported data. Recognizing the difficulty in obtaining and making available the utility-specific data in a way that would meet the transparency and replicability objectives, the EWG pursued alternatives leveraging currently available publicly reported data. System average approaches – basing avoided cost estimates on the cost of the existing T&D system – as well as incremental project cost approaches – looking at recent T&D investments – were also presented to the EWG. The EWG and stakeholders' clear

[6] Stakeholders included leadership of associations representing energy efficiency, utility, ratepayer, industrial, and renewable energy interests.

preference was the incremental cost approach. The shared expectation is that incremental costs are most representative of costs that would be avoided due to Focus programs, and data from recent projects are more readily available and reliable.

The EWG found, in the absence of an industry best practice, the recommended approach is still consistent with those used in other jurisdictions, and the resulting values are in-line with expectations. Furthermore, the method aligns with previous EWG recommendations by drawing upon publicly available data sources that are regularly and reliably updated. Previous examples of EWG recommendations favoring publicly available and regularly and reliably updated data have included its recommendations for calculating natural gas avoided energy costs (PSC REF#: 230327) and for calculating avoided capacity costs (PSC REF#: 386919). Based on these conclusions, the EWG unanimously accepted the incremental cost approach, and approved forwarding the recommendation to the Commission for consideration. Although all members of the EWG participated in the review of the approach, the Program Administrator (APTIM) representative and the utility representative each recused themselves from voting on the recommendation in order to avoid any perceptions of conflict with their roles outside the EWG. The Recommended Approach section below presents the EWG's recommended approach for calculating avoided T&D costs including the step-by-step methodology, data sources, assumptions, and resulting values for Quad III.

Expected Uses and Implications

In considering a method and calculating values for avoided T&D, a clear understanding of the uses of the values is important. The approach and values recommended by the EWG are specific to the evaluation of the benefits from electric energy savings and demand reduction resulting from Focus. When used as an input to the calculation of benefits that is conducted

during the evaluation process, the values must also be applied to the assessment of potential for energy efficiency – the Potential Study – that is currently underway in support of Quad IV planning (Docket 5-FE-104) so that study's results do not get out of alignment with the evaluation methods used in practice. As the avoided cost benefits increase, a measure's energy and demand savings become more cost-effective, all else equal.

Since the beginning of Quad II, there have been a number of instances when changes to reported savings, costs, or benefits have occurred because of factors exogenous to Focus. These can be caused by refinements to calculation methods, updated versions of third-party tools, new economic data, or other updated inputs.[7] In each of these instances, it has been the EWG's practice to direct the Evaluator to present two sets of results in its evaluation reports. These parallel analyses – either using both old and new approaches, or re-running previous year results alongside current year result – are intended to provide a clear understanding of changes that are a result of program performance versus changes that result from the exogenous factors. As such, if the proposed approach and values for avoided T&D are approved by the Commission, the EWG anticipates that it will: (1) direct the Evaluator to include in its evaluation reports benefit cost values for Focus during the Quad III cycle (2019-2022) both including and excluding the avoided T&D costs;[8] (2) advise that a scenario incorporating avoided T&D costs be included in the Potential Study; (3) advise that avoided T&D values be included among the many considerations when setting goals for the Quad IV (2023-2026) cycle; and (4) work with Commission staff to identify ways to improve the resolution, availability, and transparency of

[7] Examples include the change in Commission approved value for CO2, and version updates to the model used in calculating economic impacts: REMI PI+/REMI E3+.
[8] A noted benefit of including these values would be as a baseline for understanding the performance of Quad IV programs – should the Commission direct the inclusion of avoided T&D costs as part of the evaluation process for that cycle.

data from utilities and other entities investing in T&D resources in Wisconsin (additional detail highlighting the value of improved data resolution and transparency to support the EWG's recommended methodology can be found in the Recommendations section below).

Recommended Approach

The EWG's recommended approach for calculating avoided T&D is an incremental cost approach. Calculating avoided T&D values using this approach begins with a spreadsheet of annual transmission statistics for years 2005 to 2018 obtained by performing a query of Investor Owned Utility (IOU) Annual Reports on the PSC website.[9] These data are part of the IOU Annual Reports filed by utilities each year as required under Wis. Stat. §196.07. Transmission line statistics data used for the recommended approach are reported under Schedule E-30 of these reports.

The data utilized for the recommended approach includes a list of transmission projects with voltages ranging from 345 kilovolt-ampere (kVA) down to 12.47 kVA. These data also include extent of associated lines and total costs. Key analysis assumptions include a threshold of 40kV, with lines above that designated as transmission, and less than that level being designated as distribution[10]; lifetimes of 50 years for transmission and 30 years for distribution (the effective useful life (EUL) in the equation below); a power factor of 0.8; a discount rate of 2.0 percent (represented by the term *r* in the equation below); and the growth rate of construction

[9] The PSC IOU Annual Report Data Website is available at https://apps.psc.wi.gov/ARS/IOUqueries/default.aspx. Download options include "Electric Operating Section," "Transmission Line Statistics," select all report years,"Utility/Utilities," select all utilities (requires multiple downloads).

[10] The transmission line statistics report spreadsheet does not include any projects with operating voltages between 35.1 and 45.9 kV. Although the PSC has generally considered distribution lines as having voltages between 4-35 kV (see the PSC Publication "Electric Transmission Lines" available here: https://psc.wi.gov/Documents/Brochures/Electric%20Transmission.pdf), this analysis is using 40 kV as the threshold for determining whether a project is Transmission or Distribution to avoid any potential for confusion on whether 35 kV projects are being included or excluded as distribution projects.

costs (for projected avoided cost values) linked to the values used in the avoided capacity cost calculation. The discount rate assumption is consistent with the Commission's ordered value to be used in the calculation of all future benefits of Focus for Quad III. (PSC REF#: 343909.) The assumption for the growth rate of construction costs is consistent with the source used to calculate avoided capacity costs for the purpose of evaluating Focus. (PSC REF#: 390566.) The steps in deriving the avoided cost are as follows:

$$Project\ kVA * Power\ Factor = Project\ kW$$

$$Project\ kW * 8{,}760\ hours\ per\ year = Project\ kW - Year$$

$$Project\ Cost\ (\$) \div Project\ Miles = Cost\ per\ Mile$$

$$Cost\ per\ Mile\ \div Project\ kW - Year = Project\ Cost\ per\ Mile\ per\ kW - Year$$

$$Annulized\ Cost\ per\ Mile\ per\ kW - Year = \frac{r * Project\ Cost\ per\ Mile\ per\ kW\ Year}{1 - (1 + r)^{Project\ EUL}}$$

In order to reduce the year-to-year variability of the costs, a four-year running average of the total miles and the annualized cost per mile per kW-Year are multiplied to get the average cost per kW-Year. The four-year period for averaging cost was selected to be consistent with the four-year quadrennial timeframes for Focus. For projecting values in future years, this analysis uses the same approach as the avoided capacity calculation: the rate of inflation of the Wisconsin Department of Transportation Chained Fisher Construction Cost Index in excess of the U.S. Bureau of Labor Statistics Consumer Price Index.[11] The result is an inflation of the 2018 cost value by 2.065 percent per year to 2051. The four-year running average of miles is scaled at the average growth rate that has been observed in the data between 2005 and 2018. For both transmission and distribution, this yielded a small year-over-year increase in average cost per

[11] Bureau of Labor Statistics Midwest CPI Summaries available here: https://www.bls.gov/regions/midwest/cpi-summary/home.htm.

mile, and a decrease in the number of miles. The result of the analysis are avoided T&D values starting at $66.22/kW-Year in 2018 growing to $69.79/kW-Year in 2051. The table on the following page shows the annual avoided T&D cost values from 2018 to 2051. It should be noted that the values in the table are a net present value, consistent with the values for other avoided costs incorporated into Focus' cost-effectiveness calculations.

Calculated and Forecasted Avoided T&D Costs

Year	Avoided T&D Cost ($/kW-Year)
2018	$66.22
2019	$66.28
2020	$66.34
2021	$66.40
2022	$66.47
2023	$66.54
2024	$66.61
2025	$66.69
2026	$66.76
2027	$66.85
2028	$66.93
2029	$67.02
2030	$67.11
2031	$67.21
2032	$67.31
2033	$67.41
2034	$67.51
2035	$67.62
2036	$67.73
2037	$67.85
2038	$67.97
2039	$68.09
2040	$68.21
2041	$68.34
2042	$68.47
2043	$68.61
2044	$68.74
2045	$68.88
2046	$69.03
2047	$69.17
2048	$69.32
2049	$69.48
2050	$69.63
2051	$69.79

Recommendations

The EWG recommends that Focus calculate avoided T&D costs from annual transmission statistics from the PSC IOU Annual Report Data Website. The EWG intends to monitor and assess this approach over the remainder of the 2019-2022 Quad to assess the volatility in the escalation rate/forecasted values relative to the market. The EWG will also monitor the appropriateness of the approach in reflecting both the benefits generated by the program and the priorities for Focus as established by the Commission. In addition, the EWG intends to work with Commission staff to pursue modification to the IOU annual reporting requirements to improve its ability to understand which T&D investment costs are representative of the costs avoided by Focus programs.

With respect to efforts toward improving data informing the avoided T&D calculation, the present analysis of avoided T&D is based upon the best available data using industry consistent practices. Moreover, the recommended approach seeks to exclude those T&D costs that may not be representative of costs avoided by Focus programs as determined in discussions with EWG members, Commission staff, and stakeholder interviews. Unfortunately, the data needed to ascertain the applicability of individual projects for this analysis is not consistently available. For example, projects that aim to improve reliability with investments in undergrounding of lines may be significantly more expensive than other projects. Stakeholder feedback and the EWG's consensus is that these costs are often not representative of the costs avoided by Focus programs and as a result, to the greatest extent possible, these projects are eliminated from the analysis of avoided T&D costs.[12] Not all projects contained in the

[12] In discussions with Commission staff, it was pointed out that certain underground distribution projects – particularly in metropolitan areas – may actually be appropriate to include in the analysis. Gaps in the current data prevented any consideration or analysis of this recommendation.

Transmission Line Statistics report from the Commission's annual report website (the primary data source for inputs to the recommended approach) identify a "Type of Supporting Structure", the field that sometimes notes underground (or UG) projects. Many records are blank, use non-standard or inconsistent naming conventions, abbreviations, or use the term "various". Improved visibility into, and consistent reporting on, the primary purpose of these projects would not only be useful for improving the avoided T&D calculation, it is a data gap noted by stakeholders representing industrial customers, renewable energy advocates, and ratepayer advocates. For use in calculating avoided T&D costs, it would be useful in understanding whether investments are justified as addressing needs for capacity expansion, reliability/resilience improvements, grid modernization, grid extension, and repair/maintenance – or estimate percentages for each category when projects address more than one.

In order to avoided dramatic swings from one quadrennium to the next, and to ensure that the benefits calculated as part of the evaluation of Focus do not get out of alignment with market realities, trends, and forecasts, the EWG recommends that the Evaluation Contractor review avoided T&D cost values annually as is the current process for other avoided costs. The findings from each annual review are to be presented to the EWG. Consistent with the annual review process established for other Focus avoided costs, the EWG may, at its discretion, recommend to the Commission that an update to the avoided costs be considered more frequently than once per quadrennium. (PSC REF#: 390566.) Therefore, the Commission may wish to direct the EWG to review avoided T&D cost values annually.

The EWG recommends any avoided T&D costs approved by the Commission be incorporated into a parallel analysis of benefits achieved by Focus programs as part of the evaluation of Quad III programs. The cost-effectiveness analysis should continue to be

conducted as consistently as possible with previous evaluations from Quad II and Quad III, and results both with and without avoided T&D cost values reported. This will establish a baseline to which Quad IV performance can be compared while maintaining the ability to compare Quad III performance to performance from previous quadrenniums.

The EWG further recommends that avoided T&D costs be included among the considerations in planning for Quad IV of Focus. Direction from the Commission to consider applying avoided T&D costs for the purposes of evaluating Focus during Quad IV planning would ensure the EWG and Commission revisit this topic during the next quadrennial planning process. If the Commission chooses to approve the EWG's recommended approach and application of avoided T&D costs in Quad III, the EWG and the Commission could take into consideration Quad III analysis and monitoring of the impacts of the approach in the assessment of the appropriateness of the methodology for Quad IV of Focus.

Commission Alternatives – Avoided T&D Methodology

Alternative One: Approve the EWG's recommended methodology. Furthermore, direct Commission staff to pursue modifications to the annual IOU reporting requirements to improve the ability to ascertain the applicability of T&D projects accounted for in the avoided T&D cost calculation.

Alternative Two: Approve the EWG's recommended methodology with modifications.

Alternative Three: Do not approve the EWG's recommended methodology and direct the EWG to propose a different methodology.

Alternative Four: Do not approve the EWG's recommended methodology.

Commission Alternatives – Annual Review of Avoided T&D Costs

Alternative One: Approve EWG's recommendation to review avoided T&D costs annually.

Alternative Two: Do not approve EWG's recommendation to review avoided T&D Costs annually.

Commission Alternatives – Avoided T&D Costs in Quad III Evaluation

Alternative One: Approve the recommendation to incorporate any avoided T&D costs approved by the Commission into a parallel analysis of benefits achieved by Focus programs as part of the evaluation of Quad III programs.

Alternative Two: Do not approve the incorporation of avoided T&D costs into the evaluation of Quad III programs.

Commission Alternatives – Avoided T&D Costs in Quad IV Planning

Alternative One: Direct Commission staff to revisit avoided T&D costs in the Quad IV Planning Process.

Alternative Two: Take no action at this time.

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